WorkSafe SmartMove Certificate

Automotive Repair and Maintenance Industry Module
Study Guide

Disclaimer

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Automotive, Repair and Maintenance Industry

Learning outcomes

In this module you will:

1. Learn about common hazards encountered in the automotive repair and maintenance industry
2. Understand how to prevent injuries from common workplace hazards
3. Identify existing and potential hazards at a workplace and learn how to record them
4. Learn how to eliminate workplace hazards and reduce risks

The automotive repair and maintenance industry can become hazardous to young and inexperienced workers who are not aware of what to look out for.

Young workers work in a variety of roles in this industry including auto mechanics, glaziers, panel beaters and spray painters.

Some of the main tasks may include:

- installing, repairing and maintaining automotive mechanical systems
- repairing or replacing windscreens, and side and rear glass in automotive vehicles
- repairing damage to metal, plastic and fibreglass bodywork on vehicles
- removing rough spots on vehicle panels, sanding surfaces and carrying out masking procedures, and colour matching and mixing paints
- using, cleaning and maintaining various equipment and machines
- preparing cost estimates and documentation for clients.

Areas associated with working safely in the automotive repair and maintenance are:

- machinery and equipment
- slips, trips and falls
- manual tasks
- hazardous substances
- electricity
- noise
- fire and explosion hazards

Machinery and equipment

A mechanic died when the vehicle he was working on fell from a two-post vehicle hoist. The vehicle was positioned on the hoist when it moved on one of the support arms, causing it to drop at an angle. This caused the other hoist support arm to move and the vehicle fell, trapping the mechanic underneath it.

In the automotive repair and maintenance industry, workers use machinery, equipment and tools such as mechanical aids (e.g. hoists, cranes, garage creepers), hydraulic and pneumatic tools, and hand tools (e.g. ratchet sets and wrench sets, crowbars, socket sets, screwdrivers).

When working with or near machinery and equipment the mechanical hazards you may encounter include:

- moving parts that can reach, hit or crush you, such as booms or mechanical arms
- ejecting objects or material (parts, components, products or waste items) that may strike you
- being hit by mobile machinery and equipment

- being caught in or between rotating parts such as wheel balancers or rim straighteners.

Machine guarding can prevent or reduce access to dangerous areas of the machine. A guard can perform several functions such as protecting you from moving parts, containing ejected parts from the machine, preventing emissions escaping or forming part of a safe working platform.

Examples of dangerous machinery and equipment

Vehicle hoists

Vehicle hoists are used to raise whole vehicles off the ground so that a technician can easily work on the underside of the vehicle. They are also used for raising the vehicle to a height that removes the need for the technician to bend down. When changing tires, a technician raises the vehicle to waist height to avoid excessive bending.

Potential hazards from using vehicle hoists include falling vehicles or objects, trapping hazards, crushing hazards and hair and clothing getting caught in moving machine parts. Workers need to be provided with adequate and appropriate information, instruction, training and supervision for safe use of the hoist. Never use this machine unless you have been instructed and given permission, and the machine is safe to use.

Angle grinders

Angle grinders are hand-held tools with a rotating disc used for grinding and polishing work. Angle grinders are designed for grinding, not cutting.

The most common angle grinder injuries are from metal particles lodging in the operator's eye. The most serious injuries are from kick-back, where the disc is thrust back violently towards the operator.

Being hit by moving vehicles

Serious incidents can occur to workers and visitors during pedestrian movement near vehicles, reversing and manoeuvring, arrivals or departures, loading or unloading.

To avoid incidents, your employer should have a traffic management plan in place, including:

- designing traffic routes so they are wide enough for the largest vehicle using them. They should be one-way (if possible) and have clearly signed traffic instructions
- providing signs, barriers and/or designated walkways defining the areas where visitors may have access. Visitors should be able to get to office areas without having to access high-risk workshop areas
- workers being aware of and able to redirect customers to the correct access areas
- ensuring the movement and speed of vehicles is managed to minimise the risk of injury to pedestrians and vehicle operators.

Let's have a look at how to stay safe

- Keep all guards in place. Any guard removed during cleaning must be replaced before you use the machine. It is there to protect you from moving parts.
- Operate all machinery and equipment correctly and safely. Follow safe work procedures. Ask your supervisor to show you if safe work procedures are not available. Switch machinery and equipment off when not in use.
- When first using machinery and equipment, you must be supervised until you are competent. You may be buddied up with an experienced worker so skills, knowledge and experience can be shared.
- Don't work alone with machinery unless it has a 'deadman' switch. This switch stops the machine straight away if the pressure on the hand or foot pedal or lever is released.
- Wear PPE given to you and wear clothing that won't get caught.
- Keep the area around the machinery clean
- Do not work in the fall zone of ramps or underneath vehicles that are not adequately supported

Quiz – Machinery and equipment

1. Guards are fitted to machinery to:
   a. protect you from moving parts
   b. contain ejected parts from the machine
   c. prevent emissions escaping
   d. all of the above

2. The most common angle grinder injuries are from:
   a. discs that shatter or explode
   b. kickback, where the disc is thrust violently away from the object it is grinding and back towards the operator
   c. electric shock
   d. metal particles lodging in the operator's eye

3. Identify **four** potential hazards from using vehicle hoists.
   a. Falling vehicles or objects
   b. Catching cold or fever
   c. Trapping
   d. Crushing
   e. Hair and clothing getting caught in moving machine parts

4. Which of the following statements identify a traffic management plan to prevent workers and pedestrians being hit by moving vehicles?
   a. Visitors should be able to access the high-risk workshop areas directly.
   b. There should be two-way traffic.
   c. The movement and speed of vehicles should be managed to minimise the risk of injury to pedestrians and vehicle operators
   d. All of the above

Slips, trips and falls

A young mechanic apprentice was carrying a large drip tray that obstructed his view of the floor. As he passed through the doorway he tripped over a trailing air compressor cable, breaking his elbow and injuring his back.

Slips, trips and falls are common causes of injury in the automotive repair and maintenance industry. They can result in serious harm and lengthy time off work. These types of injuries can also affect young workers in their everyday social and school lives and may mean they cannot play sport or engage in physical activities or hobbies.

A slip, trip or fall may cause injuries, including:

- broken bones when colliding with an object or hitting the ground
- cuts if it occurs near sharp objects

- sprains
  or strains

Slips, trips and falls can be caused by:

- slippery floors from spillages of oil and grease and loose components such as screws
- wearing unsuitable shoes
- objects on the floor such as boxes, materials, ramps and tools left in walkways
- unstable, loose, and uneven surfaces like broken concrete floor or torn mats
- holes at ground level such as service pits and drains
- stairs or steps, especially when carrying items that obscures the view of the floor
- poor lighting
- being hit by a falling object

What can your employer do to prevent slips, trips and falls?

Your employer should:

- allow safe movement in the workplace by ensuring entries and exits are free of obstructions
- ensure floors and surfaces in the workplace are well-maintained and installed with task appropriate surfaces.
- cover pit openings when they are not in use
- provide adequate lighting for safe movement
- maintain workplaces in clean and tidy condition
- provide tools and equipment to assist in working safely
- ensure workers wear suitable footwear with appropriate treads that are kept clean.

How can you prevent slips, trips or falls at work?

- Wear steel toe shoes with treads that are kept clean – incorrect footwear can cause slips and trips.
- Clean up spillages straight away using appropriate cleaning agents and dry the floor to ensure the surface is not left wet.
- Keep walkways clear of obstacles especially during busy work times, keep work areas tidy, and avoid trailing cables across high traffic areas.
- Remove waste/rubbish regularly from work areas.
- Carry items only at a height that you can safely see over to avoid trip hazards and bumping into things.

Quiz – Slips, trips and falls

5. Slips, trips and falls in an auto garage can be caused by:
   a. slippery floors from spillages of oil/grease
   b. objects on the floor such as boxes, materials and tools left in walkways
   c. holes at ground level such as service pits
   d. all of the above

6. What safety precaution can you take to avoid slips?
   a. Wear fashionable shoes with thick heels to work.
   b. Leave spillages for someone else to clean.
   c. Trail cables across high traffic area.
   d. Carry items only at a height that you can safely see over.

Manual tasks

Manual tasks are any activities or sequence of activities that require a person to use their physical body (musculoskeletal system) to perform work.

Most jobs require several types of manual tasks to be performed. However, not all manual tasks are hazardous. The most common injuries and health issues that can arise from performing manual tasks are musculoskeletal injuries.

Examples of musculoskeletal injuries are:

- sprains and strains of muscles, ligaments and tendons (e.g. back strain)
- joint injuries
- disc protrusion or disc herniation of the back
- hernias of inner or outer groin
- nerve injury or compression
- muscular and vascular disorders (e.g. carpal tunnel syndrome or repetitive strain injury)
- soft tissue injuries

How does performing a manual task result in injury?

Contrary to popular belief, it's not just the weight of an object that creates the risk of musculoskeletal injuries. Auto mechanics will often be bending, reaching, lifting or moving equipment and materials and working in awkward positions, such as under car bonnets and inside service pits.

Workers are at risk of suffering manual task injuries due to:

- increased effort (force)
- awkward postures
- applying pressure on one part of the body
- performing the same action quickly and repeatedly
- lifting heavy objects

What can your employer do to prevent injury from performing manual tasks?

- Your employer has a responsibility to provide and maintain a safe workplace. If you are about to perform hazardous manual tasks and you are unsure how to go about it, ask your employer or supervisor for assistance.
- Your employer should provide you with **risk management* and ***task specific training* where hazardous manual tasks have been identified at your workplace.

> **Risk management* refers to the steps required to manage workplace hazards described as **SAMM**-*Spot the hazard; Assess the risk; Make the changes; Monitor and follow-up.*
>
> ***Task specific training* is the practising of actual tasks that will be performed during the course of work.*

Task specific training should be provided:

- during induction to the task
- as part of your refresher training
- when work tasks are about to be changed or introduced

There are a variety of ways you can be trained. Methods include a buddy system, demonstrations, training by observation, training at staff meetings, toolbox talks and practice sessions.

After the training, you should be able to:

- recognise the risks and the sources of those risks, and in discussion with your employer or supervisor decide the best way to minimise them
- prepare the workplace layout and surroundings to perform manual tasks safely
- prepare the load for manual handling, where applicable

- organise tasks and workflow to minimise the risk of injury
- use relevant mechanical aids and handling devices (such as cranes, undersides and hoists) provided to you
- use tools or equipment provided to you

> ***Remember:***
>
> *Young and new workers are at a greater risk of lifelong injuries due to performing hazardous manual tasks. Speak up if you think the task is too much for you.*

Quiz – Manual tasks

7. The most common health problems that can arise from hazardous manual tasks are:
   a. musculoskeletal injuries
   b. cold and flu
   c. bone cancer
   d. food allergies

8. What types of injuries may result from performing hazardous manual tasks?
   a. Body stressing injuries
   b. Nerve injury or compression
   c. Muscular and vascular disorders
   d. All of the above

9. When should you receive task-specific training to perform manual tasks?
   a. During induction to the task
   b. As part of refresher training
   c. When work tasks are about to be changed or introduced.
   d. All of the above

Hazardous substances

A young auto mechanic was found unconscious at an auto repairs garage during working hours. He was pronounced dead an hour after being hospitalised on the same day. The cause of death was identified as accidental carbon monoxide poisoning. He repaired a vehicle with leaking exhausts and without inadequate ventilation in the garage.

A hazardous substance can be any solid substance, liquid, gas or dust that may cause you harm.

Hazardous substances shouldn't be a problem most of the time, but things can go wrong if you:

- get them on your skin
- eat or drink them by mistake
- breathe them in
- mix substances so they become deadly
- mistake one substance for another

Hazardous substances - Examples

In the automotive repair and maintenance industry you may be exposed to hazardous substances such as:

- petrol (gasoline), diesel, liquified petrol gas (LPG)
- engine coolants, oils and lubricants
- paints, varnishes, polishes and solvents
- glue and other binding chemicals
- lead and asbestos
- cleaning and degreasing chemicals
- battery acid
- vehicle emissions
- gases from welding and soldering

Solvents

These are used as cleaners or degreasers and as ingredients in paints, inks, glue and varnishes. Solvent droplets or vapours can irritate the eyes, nose and throat. When inhaled, solvent fumes have a narcotic effect. Symptoms include dizziness, headaches, light-headedness and nausea. At high concentrations they can cause unconsciousness and damage to the nervous system, liver and kidneys.

Spray paints

Spray paints may contain harmful substances that can cause dermatitis, and high or frequent exposure to paints could damage your brain, reproductive system, kidneys or liver. Oil-based paints are usually flammable.

Asbestos fibres

The use of asbestos friction products was banned from the end of 2003 and, as a result, these products can no longer be sold or fitted to vehicles. Asbestos was once used in gaskets, particularly where heat can be a problem such as in engine heads and vehicle exhaust manifolds. While modern vehicles have asbestos-free parts, there is asbestos in brakes, clutches and gaskets of many older or imported vehicles.

Asbestos is a health risk when its fibres are released to the air and breathed in. Asbestos dust is very toxic to inhale and may cause cancer. Be aware of asbestos dust from wear and tear on brakes and clutches, or when removing gaskets.

The best way of protecting yourself is to avoid any work practice that allows fibres or dust to be generated and become airborne. When you work on jobs that could involve asbestos, make sure you use PPE and respiratory projective equipment (RPE) provided by your employer.

Batteries

Batteries are used to store electrical energy. Lead-acid batteries are used for starting, lighting and ignition of motor and electric vehicles. Batteries contain layers of lead plates immersed in either sulphuric acid or potassium hydroxide. They also store significant amounts of energy that can give rise to explosion if not dealt with correctly.

Injuries from batteries include serious chemical burns to the face, eyes and hands, and wounds from flying pieces of metal and plastic. Burns from metal objects that have become very hot or have exploded after short-circuiting the battery’s terminals occur frequently.

Carbon monoxide (CO)

Carbon monoxide (CO) is a poisonous gas produced by operating vehicles or machinery powered by petrol or liquefied natural gas (LNG), liquefied petroleum gas (LPG) or diesel fuel motors. Because CO is colourless, tasteless and odourless, it has the potential to go undetected.

Inhaling CO prevents the blood from carrying oxygen to cells, tissues and organs. The most common symptoms of exposure to very low levels of CO over a longer period are headaches, dizziness, weakness, upset stomach, vomiting, chest pain, and confusion. If you breathe in a lot of CO it can make you pass out or kill you.

Welding fumes

Welding is the process of permanently joining two or more materials together, usually metals, by heat, pressure or both. Welding fumes can be a mixture of airborne gasses such as oxides of nitrogen (NOx), carbon monoxide (CO), carbon dioxide (CO2), ozone (O3) and shield gases including argon and helium.

Inhaling welding fumes may cause irritation of the nose and throat, tightness in the chest, asthma, wheezing, metal fume fever, lung damage, bronchitis, cancer, pneumonia, emphysema and asphyxiation.

The workplace should be fitted with a local exhaust system to help to reduce worker exposure to welding fumes. Use respirators when ventilation is not enough.

Common injuries and incidents from hazardous substances

Chemical burns

A chemical burn happens when skin or eyes come into contact with a corrosive chemical such as an acid or a base.

Lead-acid batteries and some common cleaning agents include corrosive chemicals like bleach or ammonia, and these can be found in oven, sink, drain, glass or metal cleaning products.

> ***Be aware!***
>
> *Corrosive chemicals can "eat through" clothing, metal, and other materials*
>
> *You must be trained and supervised when using corrosive chemicals*
>
> *You must wear protective gear and clothing when using corrosive chemicals*
>
> *First aid should be given for chemical burns as soon as possible*
>
> *Strong acids and strong bases react very dangerously when mixed together – they can boil and splash anything nearby*

Flammability and Explosion

Fumes of flammable liquids when mixed with air in certain proportions can create an invisible "'hazardous atmosphere" that can ignite.

Ignition sources can be obvious like cigarettes and torches, or less obvious like static electricity (zapping), hot surfaces (stoves, lamps) and electrical installations (powerpoints, switches and switch boards).

Common flammable liquids in the workplace are petrol, solvents, methylated spirits, acetone, adhesives, paints, perfume, methanol, ethanol and degreasers.

> ***Be aware!***
>
> *You must not reuse empty containers that used to contain flammable chemicals. Even if they are properly cleaned, residual fumes inside empty containers can still create hazardous atmospheres that can explode if a spark is present.*

Angle grinders produce ignition sources such as heat and sparks. Never attempt to cut or apply heat to drums that have contained flammable liquids or flammable gasses.

Areas where flammable liquids are used, mixed, or transferred from one container to another must be kept well ventilated and well separated from reception areas, offices, break rooms or other places where people can gather. In the case of a spill or leak, you need to remove any ignition source if it is safe to do so.

Pressurised gasses

Gases are kept in cylinders under high pressure. If cylinders are damaged (e.g. by being knocked over and a cylinder valve breaking), the sudden release of gas will propel the cylinder like a rocket.

Examples of pressurised gases are acetylene and oxygen cylinders for welding, and aerosols.

Be aware!

Aerosol ingredients are kept under pressure. Aerosols can explode or turn into dangerous projectiles if overheated (left in the sun, placed next to a hot machine), ruptured, pierced, shaken, or dropped.

You must not use any heat-producing equipment such as welding torches and angle grinders on sealed hydraulic cylinders.

Suffocation (Asphyxia)

Asphyxia is caused by a lack of oxygen in air resulting in deficiency of oxygen in the blood.

When present in high concentrations, common gases (nitrogen, carbon dioxide, helium, and propane) can displace oxygen in the air, especially within a confined space. Some fuel vapours from vehicles and gaseous by-products of combustion have a tendency to settle in low areas, such as vehicle service pits. Inhaling too much of common gases can cause dizziness, disorientation, abnormal heart function, unconsciousness and even death. Those gases are widely used in fire extinguisher systems and pressurised helium balloon gas.

Be aware!

Most asphyxiant gases are colourless and odourless so their presence in high concentrations may not be noticed.

Working in confined spaces is dangerous and additional measures may be required to conduct work safely, (e.g. using spotters and/or gas detectors). Confined spaces may include service pits, storage tanks, containers, cellars, utility vaults, pipes, trucks or rail tank cars, boilers, bins, ditches and trenches.

Service pits have poor ventilation which can allow hazardous atmospheres to develop. Use ventilation systems with vents in the side walls of the pit to vent vapours and fumes.

Toxicity

Toxicity is the degree to which a toxic substance can damage an organism.

Commercial cleaning/degreasing chemicals contain active ingredients (e.g. sodium hydroxide, trichloroethylene and alkaline salts) that can be toxic. They dissolve petroleum-derived grease and dirt and can cause irritation to the eyes, skin and mucous membrane; an allergic reaction; eye and skin burns; and temporary loss of hair. Workers may be harmed from prolonged exposure to these. The level of harm depends upon the dose, duration and work being done.

Be aware!

Even water based (Butyl) degreasers are not completely harmless.

Some chemicals are not toxic on their own, but can react dangerously when mixed with certain chemicals to release toxic gases. Hypochlorite (bleach for cleaning) and oil mixtures release toxic chlorine gas.

Some chemicals can release toxic gas when in contact with liquid or moisture. A common fumigant, aluminium phosphide kills insects (weevils), animals (mice and rats) and humans by releasing toxic phosphine gas.

How can you keep safe from hazardous substances?

- Read the label - look for warning pictograms and signs. Always follow the danger safety warnings.
- Read the SDS (safety data sheet) for more information about a product and how to use it safely. Your employer must provide (or have available) safety information documents for any substances or products that are hazardous.
- Check the hazardous substance register at your workplace. It is a legal requirement that your employer keeps a current register of each hazardous substance that may be used or stored in the workplace.
- Don't eat, drink or smoke when you are using or near a hazardous substance or dangerous goods.
- Don’t keep food near hazardous substances or dangerous goods.
- Always use the PPE and clothing provided by your employer.
- Know what to do and where to go if a substance affects you. If you don’t know, check with your employer.
- Keep ignition sources away from any chemicals that are potentially flammable.
- Maintain good housekeeping standards – declutter and avoid build-up of combustible materials like plastics, cardboard boxes and rags around any chemical storage.
- Workshops should have a functioning eyewash station in case of emergency.

Quiz – Hazardous substances

10. Select **three** correct actions you would take to keep yourself and others safe from hazardous substances.
    a. Read the product label
    b. Read the product SDS
    c. Follow safe work procedures
    d. Smell the substance

11. Identify **five** potential risks that can arise from using hazardous substances in the workplace:
    a. chemical burns
    b. cold and flu
    c. flammability and explosion
    d. suffocation
    e. exposure to toxic or poisonous substance
    f. cold burns
    g. musculoskeletal injuries
    h. fall from a height

12. Which of the following statements is correct?
    a. The use of asbestos friction products was banned from the end of 2003. These products can no longer be sold or fitted to vehicles.

b. While modern vehicles have asbestos-free parts, there is asbestos in brakes, clutches and gaskets of many older or imported vehicles.
c. Asbestos dust is very toxic to inhale and may cause cancer.
d. All of the above

13. Solvents are used in the automotive repair and maintenance industry as:
    a. ingredients in paints, ink, glue and vanishes
    b. soap ingredients to clean dirty hands
    c. cleaners or degreasers
    d. fuel for motor vehicles

Electrical safety

Electric shocks happen when a person becomes part of an electrical circuit and the current flows through their body. Electricity passing through the body can cause convulsions (involuntary contractions of the muscles), the heart to stop beating, and internal and external burns. It can also cause secondary injuries resulting from falls or collisions and fire hazards resulting from an electrical fault.

Incidents with electricity are usually caused by:

- broken equipment or dangerous working conditions such as frayed or broken power cords, plugs or power points
- installation and/or repairs being undertaken by an unqualified repairer
- absence of a *residual current device (RCD) and lack of testing of RCDs
- a lack of experience, training or supervision

> *An *RCD is a safety switch or life-saving device designed to prevent you from receiving an electric shock if you touch something live, such as a bare wire. If you are using portable electrical equipment and extension leads at work, there must be an RCD installed at the switchboard, built into a fixed socket or the equipment used through a portable RCD outlet. The RCD must be regularly tested. This is a legal requirement*

Lockout procedure

When cleaning, maintaining or adjusting machinery and equipment, a lockout procedure is required to safeguard the workers who carry out the tasks.

Lockout is a safety procedure to ensure that dangerous machines and equipment are properly shut off and are not able to be started up again prior to the completion of the maintenance or repair work.

The lock procedure is used when:

- servicing or repair work places workers in danger
- a machine guard is removed for servicing

There are three steps involved when locking out machines and equipment.

Step 1: Lock

This means the electrical circuits must be shut down and locked.

This is when a lock is put on an ON switch so the machine can't be turned on. Only the person who put it on can remove it. If that person isn't available, strict rules need to be followed to ensure it is removed safely.

There are a wide range of 'locks' that can be used in this process. These can be: switches with a built-in lock, chains and jaws or hasps.

Step 2: Tag

Tag refers to the information tag attached to a power source or piece of equipment warning others not to operate it. Tags have information about the name of the person working on the equipment, the time and date of the work and the equipment that's being isolated. Types of tags commonly used in the lockout procedure are danger tags and out of service tags.

Step 3: Test

This means that all power sources need to be checked with proper test instruments to make sure everything is right before going ahead with work.

Let's have a look at how to stay safe

- Understand the lockout procedure. Do not operate or use machinery and equipment that is locked and/or tagged.
- Always switch off electrical equipment at the powerpoint before you pull out the plug.
- Use equipment properly. Regularly check and clean the equipment that you use and follow the equipment's operating instructions.
- Report any breakdowns or faulty equipment to your employer. It is the responsibility of your employer to make sure equipment is in good working order.
- Leave repairs to the experts. When electrical repairs are undertaken by people who are not qualified, serious and fatal injuries can occur.
- Don't overload powerboards with lots of appliances. Only use powerboards fitted with overload protection.
- Be aware of the locations of all safety switches and what equipment they cover in case equipment needs to be switched off in an emergency. You may ask this question during your induction.
- Know emergency procedures for electrical hazards.

> ***Remember:***
>
> *Water and electricity don't mix. Only use electrical appliances designed for use in the work environment (e.g. splashproof or waterproof if used around water). Don't plug in or unplug electrical equipment with wet hands or while touching a wet surface.*

Electric and hybrid vehicles

Workers in the automotive industry are increasingly involved in repairing and maintaining electric and hybrid vehicles (E&HVs). Working with or near E&HVs can become hazardous. The repair and maintenance of E&HVs should only be performed by the qualified and experience person.

Be aware that the vehicles:

- contain parts with high voltage components and cables that are capable of delivering a fatal electric shock
- contain storage of electrical energy with the potential to cause explosion or fire
- contain components that may retain a dangerous voltage even when a vehicle is switched off
- could move unexpectedly due to magnetic forces within the vehicle and its systems.

Quiz – Electricity

14. A lockout procedure is used whenever:
    a. the servicing work to be done places workers in danger
    b. a machine guard is removed for servicing
    c. repair work to be done places workers in danger
    d. all of the above

15. There are three specific steps in locking out machinery and equipment. These steps are:
    a. lock, look and tag
    b. lock, tag and test
    c. tag, do and test
    d. lock, test and try

16. Which of the following statements is correct?
    a. E&HVs contain parts with high voltage components and cables that are capable of delivering a fatal electric shock.
    b. E&HVs contain storage of electrical energy with the potential to cause explosion or fire
    c. E&HVs contain components that may retain a dangerous voltage even when the vehicle is switched off
    d. All of the above

Noise

Noise can be a workplace hazard. The higher the dose of noise, the greater the risk to the worker's hearing. Auto mechanics work with engines and noisy power tools such as angle grinders, and compressors and compressed gases. These can generate noise levels that can cause permanent hearing loss.

The noise dose is dependent on three factors:

- Intensity/Loudness: measured by a noise level meter and is described in decibels (dB)
- Frequency: the number of sound vibrations in one second and is measured in hertz (Hz)
- Duration: the length of time workers have been exposed to noise

If you have to raise your voice to be heard, the noise level is likely to be 85 dB (A) or more.

In Western Australia, the law sets a workplace exposure standard averaged over eight hours to be 85 dB (A) (e.g. the sound levels of a vacuum cleaner), or a peak noise level of 140 dB (e.g. the impact noise of sledge-hammering or the explosive noise of a gunshot). Any noise exposure above 140dB can create almost instant damage to hearing.

What can your employer do?

Where the exposure standard is exceeded, your employer must provide solutions to noise hazards such as:

- choosing quieter machinery and equipment
- keeping equipment in good working condition
- reducing machinery and equipment vibration, and muffling engine and compressed air noise
- placing a barrier between the noise source and the worker
- isolating the noise source in an insulated room or enclosure
- providing you with hearing protectors (i.e. earplugs and earmuffs) to use along with all other control measures.

What can you do to protect your hearing?

To safeguard your hearing, you must wear the hearing protectors that have been given to you. It might seem like there is nothing wrong with your hearing, but the damage is done without you noticing it.

Hearing protectors, like earplugs and earmuffs, should be regularly cleaned, repaired and stored near noisy areas.

> ***Remember:***
>
> *The most important factor for effectiveness of hearing protection is wearing it.*

Quiz – Noise

17. What controls at your workplace can reduce noise exposure?
    a. Keeping equipment in good working order
    b. Choosing quieter machinery and equipment
    c. Using sound absorbing material
    d. All of the above

18. The most important factor for effectiveness of hearing protection devices is:
    a. style
    b. appearance
    c. colour
    d. wearing it

19. To prevent hearing loss at work, the law sets a workplace exposure standard averaged over eight hours to be _____dB(A).
    a. 85
    b. 95
    c. 140
    d. 200

Fire and explosion hazards

A serious accident occurred at a mechanical workshop involving the ignition of a flammable liquid used to clean car components. An ignition source was introduced near an open tray of solvent which ignited the fumes, causing serious burn injuries to a worker attempting to control the fire, and destroying the building.

Automotive garages/workshops are in environments that are exposed to highly flammable materials such as fuel and combustible liquids.

Potential fire and explosion hazards are initiated from the combination of three main sources: a fuel source, ignition source, and air. Because all three elements are present in garages and workshops, there is a significant risk of fire and explosions occurring. Workers must follow safe systems of work to ensure that the three elements remain separated.

What can your employer do to keep you safe?

- Implement fire safety procedures and provide sufficient firefighting equipment.
- Make sure an evacuation plan is put somewhere visible and understood by all workers. Exits should be clearly marked.

- Provide
  training to workers who may be required to use fire extinguishers, including the proper techniques for combating different types of fires.
- Fire safety installations (fire alarms) should be regularly maintained by qualified personnel. Fire extinguishers need to be marked, charged and checked monthly for expiration.

How can you keep safe?

- Understand and follow the fire safety procedures for your workplace, such as where fire extinguishers are located and where emergency exits are.
- Store flammable materials appropriately and away from heat sources.
- Store gas cylinders outside the building in secure cages.
- Participate in fire drills and practice what to do in a fire situation.
- Clean oil spills, tidy away used oil filters, rags and paper, and store them in fire-resistant containers (e.g. a metal bin with a lid).
- Carry out hot work (such as welding and flame cutting) away from flammable materials.
- Keep the quantity of flammable substances to a minimum.
- Never use thinners, paints or petrol to light rubbish fires.
- Practice good housekeeping to reduce the risks of fire.
- Stop, drop and roll. If you do catch fire, rolling around on the floor is the quickest way to smother the flames.

Quiz – Fire and explosion hazards

20. What are the three combined sources in garages and workshops that initiate a fire or explosion?
    a. Fuel source, ignition source and water
    b. Hot temperature, fuel source and air
    c. Fuel source, ignition source, and air
    d. Sea, sun and sand

21. What can you do to help prevent fire and explosion hazards at work?
    a. Store flammable materials near heat sources.
    b. Keep the quantity of flammable substances to a minimum.
    c. Use thinners or petrol to light rubbish fire.
    d. Carry out hot work near gas cylinders.

22. All workers should participate in fire drills at work so that they will know what to do in case of fire.
    a. True
    b. False

Spot the hazards

Kamal Motor Ltd

There are 6 hazards in this area. Try and find them all

Hazard note book

Fill in the hazard notebook

#	Spot the hazard	Assess the risk	Make the change	Monitor and follow-up
1	Worker overstretching to mount a wheel	Moderate	Ask the person to lower the hoist to a more comfortable height	Keep a record of the hazard to warn others
2				
3				
4				
5				
6				

Automotive repair and maintenance industry – Knowledge quiz

1. Guards are fitted to machinery to:
   a. protect you from moving parts
   b. contain ejected parts from the machine
   c. prevent emissions escaping
   d. all of the above

2. The most common angle grinder injuries are from:
   a. discs that shatter or explode
   b. kickback, where the disc is thrust violently away from the object it is grinding and back towards the operator
   c. electric shock
   d. metal particles lodging in the operator's eye

3. Identify **four** potential hazards from using vehicle hoists.
   a. Falling vehicles or objects
   b. Catching cold or fever
   c. Trapping
   d. Crushing
   e. Hair and clothing getting caught in moving machine parts

4. Which of the following statements identify a traffic management plan to prevent workers and pedestrians being hit by moving vehicles?
   a. Visitors should be able to access the high-risk workshop areas directly.
   b. There should be two-way traffic.
   c. The movement and speed of vehicles should be managed to minimise the risk of injury to pedestrians and vehicle operators
   d. All of the above

5. Slips, trips and falls in an auto garage can be caused by:
   a. slippery floors from spillages of oil/grease
   b. objects on the floor such as boxes, materials and tools left in walkways
   c. holes at ground level such as service pits
   d. all of the above

6. What safety precaution can you take to avoid slips?
   a. Wear fashionable shoes with thick heels to work.
   b. Leave spillages for someone else to clean.
   c. Trail cables across high traffic area.
   d. Carry items only at a height that you can safely see over.

7. The most common health problems that can arise from hazardous manual tasks are:
   a. musculoskeletal injuries
   b. cold and flu
   c. bone cancer
   d. food allergies

8. What types of injuries may result from performing hazardous manual tasks?
   a. Body stressing injuries
   b. Nerve injury or compression
   c. Muscular and vascular disorders
   d. All of the above

9. When should you receive task-specific training to perform manual tasks?
   a. During induction to the task
   b. As part of refresher training
   c. When work tasks are about to be changed or introduced.
   d. All of the above

10. Select **three** correct actions you would take to keep yourself and others safe from hazardous substances.
    a. Read the product label
    b. Read the product SDS
    c. Follow safe work procedures
    d. Smell the substance

11. Identify **five** potential risks that can arise from using hazardous substances in the workplace:
    a. chemical burns
    b. cold and flu
    c. flammability and explosion
    d. suffocation
    e. exposure to toxic or poisonous substance
    f. cold burns
    g. musculoskeletal injuries
    h. fall from a height

12. Which of the following statements is correct?
    a. The use of asbestos friction products was banned from the end of 2003. These products can no longer be sold or fitted to vehicles.
    b. While modern vehicles have asbestos-free parts, there is asbestos in brakes, clutches and gaskets of many older or imported vehicles.
    c. Asbestos dust is very toxic to inhale and may cause cancer.
    d. All of the above

13. Solvents are used in the automotive repair and maintenance industry as:
    a. ingredients in paints, ink, glue and vanishes
    b. soap ingredients to clean dirty hands
    c. cleaners or degreasers
    d. fuel for motor vehicles

14. A lockout procedure is used whenever:
    a. the servicing work to be done places workers in danger
    b. a machine guard is removed for servicing
    c. repair work to be done places workers in danger
    d. all of the above

15. There are three specific steps in locking out machinery and equipment. These steps are:
    a. lock, look and tag
    b. lock, tag and test
    c. tag, do and test
    d. lock, test and try

16. Which of the following statements is correct?
    a. E&HVs contain parts with high voltage components and cables that are capable of delivering a fatal electric shock.
    b. E&HVs contain storage of electrical energy with the potential to cause explosion or fire
    c. E&HVs contain components that may retain a dangerous voltage even when the vehicle is switched off
    d. All of the above

17. What controls at your workplace can reduce noise exposure?
    a. Keeping equipment in good working order
    b. Choosing quieter machinery and equipment
    c. Using sound absorbing material
    d. All of the above

18. The most important factor for effectiveness of hearing protection devices is:
    a. style
    b. appearance
    c. colour
    d. wearing it

19. To prevent hearing loss at work, the law sets a workplace exposure standard averaged over eight hours to be _____dB(A).
    a. 85

b. 95
c. 140
d. 200

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22. All workers should participate in fire drills at work so that they will know what to do in case of fire.
    c. True
    d. False